IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES
GROUP ART UNIT: 2416 **EXAMINER:** Chou, Albert T.

INVENTOR:	Devendra Y. Raut et al.
CASE:	P8900
SERIAL NO.:	10/820,497
FILED:	04/07/2004
SUBJECT:	Edge-Router Scaling for BGP Peering with Virtual Private Routed Networks (VPRN)

Chief Administrative Patent Judge
PO Box 1450
Alexandria, VA 22313-1450

Dear Sirs:

APPEAL BRIEF

1.0 Real Party in Interest

All inventions in the disclosure in the present case are assigned to or assignable to:

Alcatel; 54, Rue La Boetie 75008; Paris, France

2.0 Statement of related cases

There are no prior or pending appeals, interferences or judicial proceedings, known to appellant, appellant's legal representative or any assignee.

3.0 Jurisdictional statement

The present Appeal Brief is taken from the decision of the examiner mailed 03/03/2009 under statute 35 U.S.C. 134. The present Appeal Brief follows a Notice of Appeal filed 4/27/2009. No extension of time has been requested.

4.0 Table of contents

5.0 Table of authorities

No authorities are asserted by appellant in the present Appeal Brief.

6.0 Status of pending claims

1. rejected
2. rejected
3. rejected
4. rejected
5. rejected
6. rejected

7. rejected

8. rejected

9. rejected

10. rejected

11. rejected

12. rejected

13. rejected

14. rejected

15. rejected

7.0 Status of Amendments

No amendments have been filed subsequent to filing a Notice of Appeal

8.0 Rejections to be reviewed

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US

Patent No. 7,039,720 to Alfieri et al. (hereinafter "Alfieri") in view of US

Patent No. 5,528,513 to Vaitzblit et al. (hereinafter "Vaitzblit").

9.0 Statement of facts

The present Appeal Brief is in response to a final rejection mailed on 03/03/2009 by Examiner Chou, Albert T. art unit 2416. The only rejection contained in the final rejection is 103(a) as being unpatentable over Alfieri in view of Vaitzblit. The Examiner relied upon said art in the immediately prior Office Action mailed 11/04/2008. Applicant presented detailed arguments regarding the references and the rejection with no amendments to the claims. In the present Office Action, made final, the Examiner maintains the rejection and responds to appellant's arguments. The Office Action mailed 06/12/2008, prepared and mailed by Examiner Root, Robert M. art unit 2616, rejected Claims 1, 3, 5, 7, 11, and 13 under 35 U.S.C. 103(a) as being unpatentable over David E. McDysan (US 2003/0112755) in view of Tung et a1 (US 5,434,913) and Keck et a1 (US 2004/0228414). Appellant presented detailed arguments with no amendments to the claims. Additionally a 103(a) rejection was presented in said Office Action Claims 2,4-5,7,9-10, 12, and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over David E. McDysan (US 2003101 12755) in view of Tung et a1 (US 5,434,913) and Keck et a1 (US 200410228414) and further in view of Bryers et a1 (US 200310126233).

The first Office Action mailed in the present case on 12/07/2007 by Root, Robert M. art unit 4183, rejected claims 1, 2, 5, 6, 7, 10, 11, 12 and 15 under 35 U.S.C. 112. Claims 1-5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Relchter et a1. (US 6,339,595) in view of Jayaralnan et a1. (US 200310210694) and further in view of Langille et a1. (US 7,242,665). Claims 6-10 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rekhter et a1 (US 6,339,595) in view of J Jayaralnan et al. (US 200310210694) and further in view of Langille et a1. (US 7,242,665). Claims 11-15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rekhter et a1 (US 6,339,595) in view of Jayaraman et a1 (US 200310210694) and further in view of Langille et a1 (US 7,242,665).

In Response to the First Office Action Appellant amended the independent claims in order to define the acronym "BGP" and include said protocol in the operation of the router, as required by the 112 rejection. Appellant provided detailed arguments against the art. No additional amendments were made to the claims in the present application.

10.0 Argument

10.1 Regarding independent claim 1

The Examiner states in the Office Action mailed 03/03/2009; page 3, 3rd paragraph:

Alfieri does not expressly teach the edge router comprises one ready list; and individual event pipelines dedicated to individual ones of BGP peers; wherein events received for processing are posted in their associated event pipelines according to the source of the events, pipelines having events to be processed insert a flag in the ready list, and the scheduler repetitively scans the ready list sequentially, and releases events to the processor resource with preset limitation per pipeline.

Vaitzblit teaches a scheduler with a weighted round-robin scheduling schemes in a network device [Figs. 1-2; a Video File Server 20 having a Scheduler 53; col. 3, line 171, comprising:

at least one ready list [Fig. 2; a block of scheduling flags 142; col. 4, lines 6- 71; and

individual event pipelines dedicated to individual ones of peers [Fig. 2**;** e.g. a first and a second network interface queues 130 and 132 for managing each of interface peers, respectively; col. 3, lines 55-59]; wherein events received for processing are posted in their associated event pipelines according to the source of the events, pipelines having events to be

processed insert a flag in the ready list [Fig. 2; A scheduling flag is used to indicate that a task has pending work and to signal the scheduler **53** that the task needs to be invoked; col. 4, lines 6-15], and the scheduler repetitively scans the ready list sequentially [Fig. 5, steps 515-520- 540-515; scan the block of scheduling flags 142 based on a round-robin algorithm, i.e. sequentially; col. 3, lines 27-28, col. 7, line 61 - col. 8, line 151, and releases events to the processor resource with preset limitation per pipeline [Fig. 5, steps 540-550; yielding the processing resources once all the scheduling flags are scanned or due to the time limitation; col. 8, lines 15-17; col. 3, lines 62-67].

Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to incorporate a scheduler with a block of scheduling flags, i.e. a ready list, to sequentially scan the pending events/tasks as taught by Vaitzblit into Alfieri's context selection logic or scheduler of the edge router, since both inventions are directed to the multiple tasks/events scheduling within a network device. The motivation for combining the reference teachings would be to enable Alfieri's edge router to achieve improved performance even in a very large network with a

large number of routes without involving expensive or extensive hardware or software modification.

Appellant's response

Applicant argues that the Examiner has failed to show where one ready list is provided in Vaitzblit, as claimed. In applicant's invention, pipelines having events posted to them insert flags for the posted events into a ready list. Vaitzblit teaches that real-time tasks are placed in queue 134 where they are assigned a weight and a flag. The scheduler 52 then intermittently scans the queue and serves the flags in a round-robin fashion. Applicant argues that, with a ready list as claimed, one scheduler may service events from a plurality of pipelines according to flags set by the pipelines. In the art of Vaitzblit the scheduler empties the isochronous queue 158, then checks queue 134 for flags, and checks queue 108 for events, then goes back to service the isochronous queue 158 as soon as an event enters the queue (col. 4, lines 62-67).

The Examiner is clearly reaching when interpreting the art of Vaitzblit. It appears to applicant that the Examiner found the term "flag" in the art and applied an unreasonable interpretation to the art in order to apply

it to applicant's claimed invention.

Applicant argues that Vaitzblit fails to teach, "individual event pipelines dedicated to individual ones of BGP peers; wherein events received for processing are posted in their associated event pipelines according to the source of the events" as claimed in applicant's invention. The Examiner states that network interfaces 130 and 132 of Vaitzblit function as queues, which is clearly in error. Vaitzblit specifically recites:

FIG. 2 shows three real-time tasks, RT1 122, RT2 124 and RT3 126. RT1 122 and RT2 124 arrived at the server 20 through a first network interface 130 and a second network interface 132. RT2 124 is directed toward a queue 134, internal to the server 20, from which RT3 126 is emerging. (col. 3, lines 55-59)

Applicant argues that, clearly, as taught above, there is only one queue for posting real time packets in Vaitzblit, which is queue 134.

The Examiner Responds to appellant's above argument in Office Action mailed 03/03/2009 stating, "First, although Vaitzblit uses the terminology "a first network interface 130 and a second network interface

132", the first network interface 130 and the second network interface 132, respectively, are used for "buffering" or "queuing" packets received from the network prior to being scheduled for processing. In other words, both network interfaces buffer the received packets in "queuing" manner, which is equivalent to the "pipeline" as Applicant calls it, for later scheduling.

Applicant argues that the Examiner may not assume subject matter is present in the art by presenting his own opinion without some remote evidence from the art to support his opinion. In this case, the Examiner has no support in the disclosure of Vaitzblit teaching or suggesting that the first network interface 130 and the second network interface 132, respectively, are used for "buffering" or "queuing" packets received from the network prior to being scheduled for processing. In fact, Vaitzblit teaches away from the Examiner's assumption when clearly teaching a queue 134 for real-time tasks, General Purpose Ready queue 108 and queue 158 for holding isochronous tasks.

Applicant points out that Vaitzblit teaches a video server 20, with clear teaching regarding scheduling of events. The design of the scheduler 53 is based on a combination of weighted round-robin and rate monotonic scheduling algorithms. Three classes of schedulable tasks are supported:

general-purpose, real-time and isochronous. A high- level view of these tasks is shown in FIG. 2, where the video server 20 has all three types of tasks running in it. Vaitzblit teaches scheduling is accomplished in a hierarchical manner. Isochronous tasks have the highest priority and are scheduled first followed by real-time and general-purpose tasks (col. 3, lines 27-32). The scheduler 53 of Vaitzblit continues to execute isochronous tasks until the isochronous ready queue 158 becomes empty. Whenever the isochronous ready queue 158 is empty, the scheduler 53 alternates between the real-time and the general-purpose classes using a weighted round-robin scheme.

Appellant argues that there are no pipelines taught in the art of Vaitzblit for posting received packets, as claimed, because Vaitzblit is a video file server 20, requiring queues to receive packets from library server 40. Further, applicant argues that Vaitzblit fails to teach that pipelines having events to be processed insert a flag in a ready list. Vaitzblit clearly teaches:

In FIG. 2, interrupt service routine ISR1 144 sets the scheduling flag for RT2 124. Interrupt service routine ISR2 146 sets the scheduling flag for

RT1 122. Real-time task RT2 124 sets the scheduling flag for RT3 126. (col. 4, lines 11-15)

As clearly evidenced in the above teaching of Vaitzblit, there is not a plurality of pipelines for posting packets taught or suggested in the art of Vaitzblit. Vaitzblit is also absent of any teaching that pipelines having events to be processed insert a flag in the ready list. The interrupt service routines ISRs 1 and 2 insert the flags as shown in the text of Vaitzblit, above. Applicant argues that the art of Vaitzblit fails to teach applicant's recited limitations of claim1, as alleged by the Examiner. Therefore, the combination of Vaitzblit and Alfieri fail to support the 103 rejection as asserted by the Examiner. Claim 1 is then patentable over the art presented by the Examiner. Claims 2-5 are patentable on their own merits, or at least as depended from a patentable claim and stand or fall together.

Claim 6 is applicant's independent method claim and appellant incorporates the same arguments made on behalf of claim 1. Claim 11 is applicant's independent method claim and appellant incorporates the same arguments made on behalf of claim 1. Claims 7-10 and 12-15 are patentable on their own merits, or at least as depended from a patentable claim. Said

claims stand or fall together.

In applicant's invention, as claimed, a scheduling process 301 receives events from the control plane, management plane, timer manager sources, and from the VPRNs. All received events are posted by the scheduler in dedicated event pipelines corresponding to their sources. When a pipeline has posted events, and only when it has posted events, that pipeline inserts its own file descriptor in ready list 306. Scheduler 301 cycles through ready list 306 and services only those pipelines that have inserted their file descriptors in the ready list. The cycling is controlled to process as many events as may be processed within a preset limit, such as a runtime limit, for example, or a maximum number of buffers are utilized.

In this manner all events for BGB peering with as many as ten thousand peers may be efficiently processed without degradation. Also completely fair scheduling is accomplished, there is no head-of-line blocking, and a busy BGP peer will not throttle operations for other clients.

11.0 Appendix

11.1 Claims section

1. (Previously presented) An edge router operating Border Gateway Protocol (BGP) in a packet network comprising:

a processor resource for processing events;

at least one scheduler managing all events for processing by the processor resource;

at least one ready list; and

individual event pipelines dedicated to individual ones of BGP peers;

wherein events received for processing are posted in their associated event pipelines according to the source of the events, pipelines having events to be processed insert a flag in the ready list, and the scheduler repetitively scans the ready list sequentially, and releases events to the processor resource with preset limitation per pipeline.

2. (Original) The edge router of claim 1 wherein individual ones of the BGP peers are virtual private routed networks (VPRNs) away from the packet network.

3. (Original) The edge router of claim 1 wherein the preset limitation is a time limitation.

4. (Original) The edge router of claim 1 wherein the preset limitation is a buffer limitation.

5. (Original) The edge router of claim 2 comprising a first and a second scheduler, a first and a second ready list, and pipelines dedicated to events associated with both VPRNs and core BGP peers in the service provider network, wherein the pipelines associated with VPRNs communicate with the first scheduler and the first ready list, and the pipelines associated with the core BGP peers communicate with the second scheduler and the second ready list.

6. (Previously presented) A method for processing events in Border Gateway Protocol (BGP) peering in an edge router in a packet network, comprising acts of:

(a) placing received events associated with BGP peers in dedicated pipelines according to the BGP source;

(b) flagging a ready list by individual pipelines having events ready to be processed; and

(c) scanning the ready list sequentially and repeatedly by a scheduler, the scheduler sending events for each pipeline to be processed to a processing resource according to a preset limitation per pipeline.

7. (Original) The method of claim 6 wherein individual ones of the BGP peers are virtual private routed networks (VPRNs) away from the packet network.

8. (Original) The method of claim 6 wherein in act (c) the preset limitation is a time limitation.

9. (Original) The method of claim 6 wherein in act (c) the preset limitation is a buffer limitation.

10. (Original) The method of claim 7 comprising a first and a second scheduler, a first and a second ready list, and pipelines dedicated to events associated with both VPRNs and core BGP peers in the service provider

network, wherein the pipelines associated with VPRNs communicate with the first scheduler and the first ready list, and the pipelines associated with the core BGP peers communicate with the second scheduler and the second ready list.

11. (Previously presented) A machine-readable medium having stored there on a set of instructions that cause a machine to perform a method for processing events in Border Gateway Protocol (BGP) peering in an edge router in a packet network, including:

(a) placing received events associated with BGP peers in dedicated pipelines according to the BGP source;

(b) flagging a ready list by individual pipelines having events ready to be processed; and

(c) scanning the ready list sequentially and repeatedly by a scheduler, the scheduler sending events for each pipeline to be processed to a processing resource according to a preset limitation per pipeline.

12. (Original) The medium of claim 11 wherein, in the method, individual ones of the BGP peers are virtual private routed networks (VPRNs) away

from the packet network.

13. (Original) The medium of claim 11 wherein in act (c) the preset limitation is a time limitation.

14. (Original) The medium of claim 11 wherein in act (c) the preset limitation is a buffer limitation.

15. (Previously presented) The medium of claim 12 wherein the method comprises a first and a second scheduler, a first and a second ready list, and pipelines dedicated to events associated with both VPRNs and core BGP peers in the service provider network, wherein the pipelines associated with VPRNs communicate with the first scheduler and the first ready list, and the pipelines associated with the core BGP peers communicate with the second scheduler and the second ready list.

11.2 Claim support section

1. An edge router operating Border Gateway Protocol (BGP) in a packet network **{Pg. 5, lines 11-15}**comprising:

a processor resource for processing events **{Pg. 2, lines 1-2; pg. 6, lines 15-26}**;

at least one scheduler managing all events for processing by the processor resource **{Pg. 6, line 27-pg. 7, line 7}**;

at least one ready list **{Pg. 7, lines 1-7}**; and

individual event pipelines dedicated to individual ones of BGP peers **{pg. 6, line 29 to Pg. 7, line 3}**;

wherein events received for processing are posted in their associated event pipelines according to the source of the events, pipelines having events to be processed insert a flag in the ready list, and the scheduler repetitively scans the ready list sequentially, and releases events to the processor resource with preset limitation per pipeline **{pg. 6 line 19 to pg. 7, line 11}**.

2. The edge router of claim 1 wherein individual ones of the BGP peers are virtual private routed networks (VPRNs) away from the packet network **{pg. 7, line 12-15}**.

3. The edge router of claim 1 wherein the preset limitation is a time

limitation **{pg. 7, lines 5-7}**.

4. The edge router of claim 1 wherein the preset limitation is a buffer limitation **{pg. 7, lines 5-7}**.

5. The edge router of claim 2 comprising a first and a second scheduler, a first and a second ready list, and pipelines dedicated to events associated with both VPRNs and core BGP peers in the service provider network, wherein the pipelines associated with VPRNs communicate with the first scheduler and the first ready list, and the pipelines associated with the core BGP peers communicate with the second scheduler and the second ready list **{pg. 7, lines 12-21, as amended}**.

6. A method for processing events in Border Gateway Protocol (BGP) peering in an edge router in a packet network **{Pg. 5, lines 11-15}**, comprising acts of:

(a) placing received events associated with BGP peers in dedicated pipelines according to the BGP source **{pg. 6, line 27-pg. 7, line 3}**;

(b) flagging a ready list by individual pipelines having events ready to

be processed **{Pg. 7, lines 1-5}**; and

(c) scanning the ready list sequentially and repeatedly by a scheduler, the scheduler sending events for each pipeline to be processed to a processing resource according to a preset limitation per pipeline **{pg. 7, lines 1-7}**.

7. The method of claim 6 wherein individual ones of the BGP peers are virtual private routed networks (VPRNs) away from the packet network **{pg. 7, line 12-15}**.

8. The method of claim 6 wherein in act (c) the preset limitation is a time limitation **{pg. 7, lines 5-7}**.

9. The method of claim 6 wherein in act (c) the preset limitation is a buffer limitation **{pg. 7, lines 5-7}**.

10. The method of claim 7 comprising a first and a second scheduler, a first and a second ready list, and pipelines dedicated to events associated with both VPRNs and core BGP peers in the service provider network, wherein

the pipelines associated with VPRNs communicate with the first scheduler and the first ready list, and the pipelines associated with the core BGP peers communicate with the second scheduler and the second ready list **{pg. 7, lines 12-21, as amended}**.

11. A machine-readable medium having stored there on a set of instructions that cause a machine to perform a method for processing events in Border Gateway Protocol (BGP) peering in an edge router in a packet network **{pg. 6, lines 19-26}**, including:

(a) placing received events associated with BGP peers in dedicated pipelines according to the BGP source **{pg. 6, line 27-pg. 7, line 3}**;

(b) flagging a ready list by individual pipelines having events ready to be processed**{Pg. 7, lines 1-5}**; and

(c) scanning the ready list sequentially and repeatedly by a scheduler, the scheduler sending events for each pipeline to be processed to a processing resource according to a preset limitation per pipeline **{pg. 7, lines 1-7}**.

12. The medium of claim 11 wherein, in the method, individual ones of the

BGP peers are virtual private routed networks (VPRNs) away from the packet network**{pg. 7, line 12-15}**.

13. The medium of claim 11 wherein in act (c) the preset limitation is a time limitation **{pg. 7, lines 5-7}**.

14. The medium of claim 11 wherein in act (c) the preset limitation is a buffer limitation **{pg. 7, lines 5-7}**.

15. The medium of claim 12 wherein the method comprises a first and a second scheduler, a first and a second ready list, and pipelines dedicated to events associated with both VPRNs and core BGP peers in the service provider network, wherein the pipelines associated with VPRNs communicate with the first scheduler and the first ready list, and the pipelines associated with the core BGP peers communicate with the second scheduler and the second ready list **{pg. 7, lines 12-21, as amended}**.

11.3 Drawing analysis section

1. (Previously presented) An edge router operating Border Gateway

Protocol (BGP) in a packet network **{Fig. 1; 102}**comprising:

a processor resource for processing events;

at least one scheduler managing all events for processing by the processor resource **{Fig. 3; 301}**

at least one ready list **{Fig. 3; 306}**; and

individual event pipelines dedicated to individual ones of BGP peers **{Fig. 3}**;

wherein events received for processing are posted in their associated event pipelines according to the source of the events, pipelines having events to be processed insert a flag in the ready list, and the scheduler repetitively scans the ready list sequentially, and releases events to the processor resource with preset limitation per pipeline **{Fig. 3}**.

2. (Original) The edge router of claim 1 wherein individual ones of the BGP peers are virtual private routed networks (VPRNs) away from the packet network **{Fig. 3}**.

6. (Previously presented) A method for processing events in Border Gateway Protocol (BGP) peering in an edge router in a packet network **{Fig.**

1; 102}, comprising acts of:

(a) placing received events associated with BGP peers in dedicated pipelines according to the BGP source **{Fig. 3}**;

(b) flagging a ready list by individual pipelines having events ready to be processed **{Fig. 3; 306}**; and

(c) scanning the ready list sequentially and repeatedly by a scheduler, the scheduler sending events for each pipeline to be processed to a processing resource according to a preset limitation per pipeline **{Fig. 3}**.

7. (Original) The method of claim 6 wherein individual ones of the BGP peers are virtual private routed networks (VPRNs) away from the packet network**{Fig. 3}**.

11. (Previously presented) A machine-readable medium having stored there on a set of instructions that cause a machine to perform a method for processing events in Border Gateway Protocol (BGP) peering in an edge router in a packet network **{Fig. 1; 102}**, including:

(a) placing received events associated with BGP peers in dedicated pipelines according to the BGP source **{Fig. 3}**;

(b) flagging a ready list by individual pipelines having events ready to be processed **{Fig. 3; 306}**; and

(c) scanning the ready list sequentially and repeatedly by a scheduler, the scheduler sending events for each pipeline to be processed to a processing resource according to a preset limitation per pipeline **{Fig. 3; 301}**.

12. (Original) The medium of claim 11 wherein, in the method, individual ones of the BGP peers are virtual private routed networks (VPRNs) away from the packet network **{Fig. 3}**.

11.5 Evidence section

1) Final rejection mailed 03/03/2009 is the Office Action setting out the rejection on appeal.

2) Patent No. 7,039,720 to Alfieri et al. and US Patent No. 5,528,513 to Vaitzblit et al. are the only references used by the Examiner in the rejection.

3) Response filed by Appellant on 01/29/2009.

Respectfully Submitted,
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